

so much heavier, than the Air of the former place was, when the *Mercury* stood at $29\frac{1}{2}$ inches.

But in making such comparisons, we must not forget to consider the Situation of the several places, if we mean to make Estimates not only of the weight of the Atmosphere, but of the weight and density of the Air. For, though the Scales will shew (as has been said) whether there be a difference of weight in the Atmosphere at the two places; yet, if one of them be in a Vale or bottom, and the other on the top or some elevated part of a Hill, it is not to be expected, that the Atmosphere, in this latter place, should gravitate as much, as the Atmosphere in the former, on which a longer Pillar of Air does lean or weigh.

And the mention, I have made of the differing Situation of Places, puts me in mind of something, that may prove another use of our *Statical* Baroscope, and which I had thoughts of making tryal off, but was Accidentally hindred from the opportunity of doing it. Namely, that by exactly poyssing the Buble at the foot of a high Steeple or Hill, and carrying it in its close Frame to the top, one may, by the weight requisite to be added to Counterpoise there to bring the Beam to its Horizontal position, observe the difference of the weight of the Air at the bottom, and at the top; and, in case the Hill be high enough, at some intermediate Stations. But how far this may assist men, to estimate the *Absolute* or *Comparative* height of Mountains, and other elevated Places; and what other Uses the Instrument may be put to, when it is duly improved; and the Cautions, that may be requisite in the several cases, that shall be proposed, I must leave to more leasure, and farther Consideration.

The Particulars.

Of those Observations of the Planet Mars, formerly intimated to have been made at London in the Months of February and March A. 1666.

To perform, what was promised *Num. 11.* of these Papers, pag. 198; 'tis thought fit now to publish the Particular Observations, concerning the spots in *Mars*, and their motion, as they were made with a 36 foot Telescope, and produced in

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writing before the *Royal Society*, the 28 *March* 1666. by Mr. *Hook*, as follows ;

Having a great desire (saith he) to observe the *Body of Mars*, whilst *Acronycal* and *Retrograde* (having formerly with a Glasse of about 12. foot long, observ'd some kind of Spots in the Face of it,) though it be not at present in the *Perihelium* of its Orbe, but nearer its *Aphelium*, yet I found, that the Face of it, when neer its Opposition to the Sun (with a Charge, the 36. foot-glasse, I made use off, would well bear) appear'd very near as big, as that of the Moon to the *naked eye* ; which I found, by comparing it with the Full Moon, near adjoyning to it, *March* 10.

But such had been the ill disposition of the Air for several nights, that from more than 20. Observations of it, which I had made since its being *Retrograde*, I could find nothing of satisfaction, though I often imagin'd, I saw Spots, yet the *Inflexive veins* of the Air (if I may so call those parts, which, being interspers'd up and down in it, have a greater or less Refractive power, than the Air next adjoyning, with which they are mixt) did make it so confus'd and glaring, that I could not conclude upon any thing.

On the third of *March*, though the Air were still bad enough yet I could see now and then the *Body of Mars* appearing of the form A: which I presently described by a *Scheme* ; and about 10. minutes after, as exactly representing what I saw through the Glasse, as I could, I drew the *Scheme* B. This I was sufficiently satisfied (by very often observing it through the Tube, and changing my Eye into various positions, that so there might be no kind of Fallacy in it) could be nothing else, but some more *Dusky* and *Spotted* parts of the Face of this Planet.

March 10. finding the Air very bad, I made use of a very shallow Eye-glasse, as finding nothing *Distinct* with the greater *Charge* ; and saw the appearance of it as in C, which I imagin'd, might be the Representation of the former Spots by a lesser charge. About 3 of the Clock the same morning, the Air being *very bad* (though to appearance *exceeding clear*, and causing all the Stars to twinkle, and the minute Stars to appear very thick) the *Body* seem'd like D ; which I still suppos'd to be
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the Representation of the same Spots through a more confused and glaring Air.

But observing *March 21.* I was surpris'd to find the Air (though not so clear, as to the appearance of small Stars) so *exceeding transparent*, and the Face of *Mars* so very well *defined*, and round, and distinct, that I could manifestly see it of the shape in E. about half an hour after Nine at night. The *Triangular* spot on the right side (as it was inverted by the Telescope, according to the appearances, through with all the preceding *Figures* are drawn) appear'd very black and distinct, the other towards the left more dim ; but both of them sufficiently plain and defin'd. About a quarter before 12. of the Clock the same night, I observ'd it again with the same Glass, and found the appearance exactly, as in F ; which I imagin'd to shew me a *Motion* of the former triangular spot : But designing to observe it again about 3. of the Clock the same Morning, I was hindred by cloudy weather.

But *March 22.* about half an hour after 8. at night, finding the same Spots in the same posture, I concluded, that the preceding Observation was only the appearance of the same Spots at another height and thickness of the Air : And thought my self confirm'd in this Opinion, by finding them in much the same posture, *March 23.* about half an hour after 9. though the Air was nothing so good as before.

And though I desired to make Observations, about 3. of the Clock those mornings ; yet something or other interven'd, that hindred me, till *March 28.* about 3 of the Clock, the Air being light (in weight) though moist and a little hazy ; when I plainly saw it, to have the form, represented in I ; which is not reconcileable with the other Appearances, unless we allow a *Turbinated* motion of *Mars* upon its Center : Which, if such there be, from the Observations made *March 21. 22. and 23.* we may guess it to be once or twice in about 24. hours unless it may have some kind of *Librating* motion ; which seems not so likely. Now, whether certainly so or not, I shall endeavour, as oft as I have opportunity, further to observe.

A particular direction to the *Figures* mentioned in the precedent discourse.

A. *March 3^d. 60^h. 20^m. in the morning: the Air having many inflec-*

ing parts dispersed up and down in it ; by the Wheel Barometer, heavy,

B. Another Scheme, which I drew from my Observation, about 10. minutes after, the same morning. Both these were observed with a very deep Eye-glass.

C. March 10^d. 00^h. 20^m. in the morning : the Air heavy and inflective . Use was made of a shallow or ordinary Charge.

D. March 10^d. 3^h. 00^m in the Morning ; the Air very heavy and inflective, which made it glare and radiate, and be more confused, than about 3. hours before. A shallow Charge.

E. March 21^d. 9^h $\frac{1}{2}$ post merid ; the Air light (in weight) and clear, without inflecting parts ; the Face appear'd most distinctly of this Forme. A shallow Charge.

F. March 21^d. 11^h $\frac{1}{4}$ post merid ; the Air continuing very light and clear, without inflecting vapours. A shallow Charge.

G. March 21^d. 8^h $\frac{1}{2}$ post mer. the Air clear, with few inflecting veins in it, and indifferent light. A shallow Charge.

H. March 23^d. 9^h $\frac{1}{2}$ post mer. the Air pretty light, but moist, and somewhat thick and hazy, but seem'd to have but few veins, or inflecting parts.

I. March 28^d. 3^h. p. m. much the same kind of Air with that of March 23 ; light, moist, and a little hazy, with some very few veins.

Observations

Made in Italy, confirming the former, and withall fixing the Period of the Revolution of Mars.

These Observations we shall summarily present the Curious in these parts with, as they were lately presented (by Letter from his Excellency the Ambassadour of Venice, now residing at the Court of France) to the Royal Society, in some printed sheets of Paper, entituled, *MARTIS, circa Axem proprium Revolubilis, Observationes, BONONIAE à JO. DOMINICO CASSINO habitæ* ; come to hand June 3. 1666.

In these Papers the Excellent Cassini affirms ;

1. That with a Telescope of 24. Palmes, or of about 16 Foot, wrought after S. Campani's way, he began to observe February 6. 1666 (st.n.) in the morning, and saw two dark Spots in the first Hæc of Mars.

2. That